An Integrated Strategy for Acquisition Reform

Presented by

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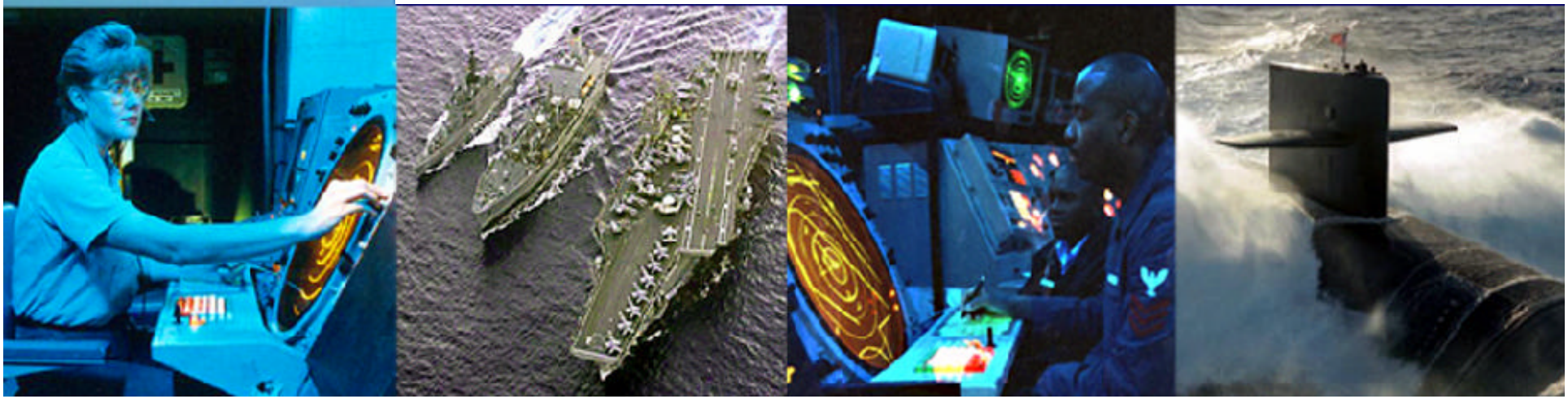
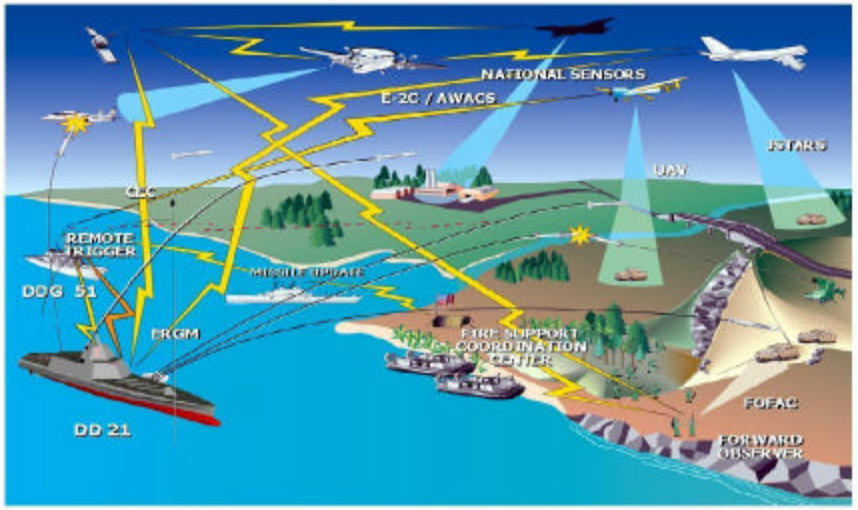
16 May 2001



Why We Must Change

- Increasing system complexity
- Need to manage mission areas/systems of systems
- Operational tempo demands on combat readiness



- Increasing cost of acquisition and maintenance
- Declining budgets
- Reduced DoD role in technology development
- Significant reduction in acquisition workforce
- Improved commercial product and process alternatives

Proposed Solutions

Many good ideas have been proposed…

Simulation Based Acquisition

SBA vision is far-reaching:

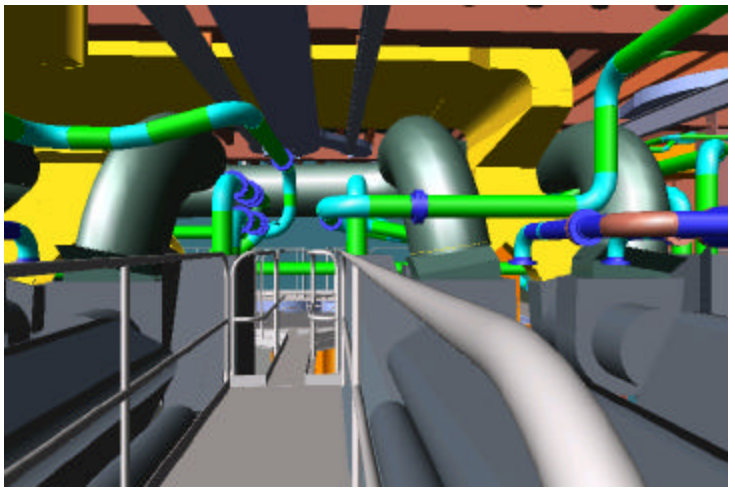
"An acquisition process in which DoD and Industry are enabled by robust, collaborative use of simulation technology that is integrated across acquisition phases and programs"

- SBA Goals:
  - Substantially reduce the time, resources, and risk associated with the entire acquisition process
  - Increase the quality, military worth and supportability of fielded systems while reducing Total Ownership Costs throughout the total life cycle
  - Enable Integrated Product and Process Development (IPPD) across the entire acquisition life cycle

Some Navy Programs and Projects
Implementing or contributing to SBA

Acquisition programs

- Joint Strike Fighter
- DD 21
- LPD-17
- AAAV
- Virginia SSN
- Advanced Tactical FLIR
- AIM-9X



Other projects

- NSRP ASE Integrated Shipbuilding Enterprise
- Navy/Industry Digital Data Exchange Standards Committee
- NATO Specialist Team for Warship Simulation Based Design and Virtual Prototyping
- Collaborative Engineering Environment (CEE)
- Distributed Object Modeling Environment (DOME)
- Leading Edge Architecture for Prototyping Systems (LEAPS)

But there’s a lot more going on…

The PM's Perspective

Agile Manufacturing

Knowledge Management

Simulation Test and Evaluation Process

Lean Initiatives

Integrated Product Data Environment

Other Transaction Authority

Simulation Based Acquisition

Whole Life Management

Total Asset Visibility

Shared Data Environment

Integrated Product Data Environment

Integrated Digital Environment

Integrated Data Environment

Integrated Product and Process Development

Performance Based Business Environment

Smart Product Models

Total Quality Management

Cycle Time Reduction

Paperless Contracting

High Level Architecture

Evolutionary Acquisition

Cost As an Independent Variable

Single Process Initiative

Joint Computer Aided Life-cycle Support

Open Systems Approach

Integrated Manufacturing Technology Roadmap

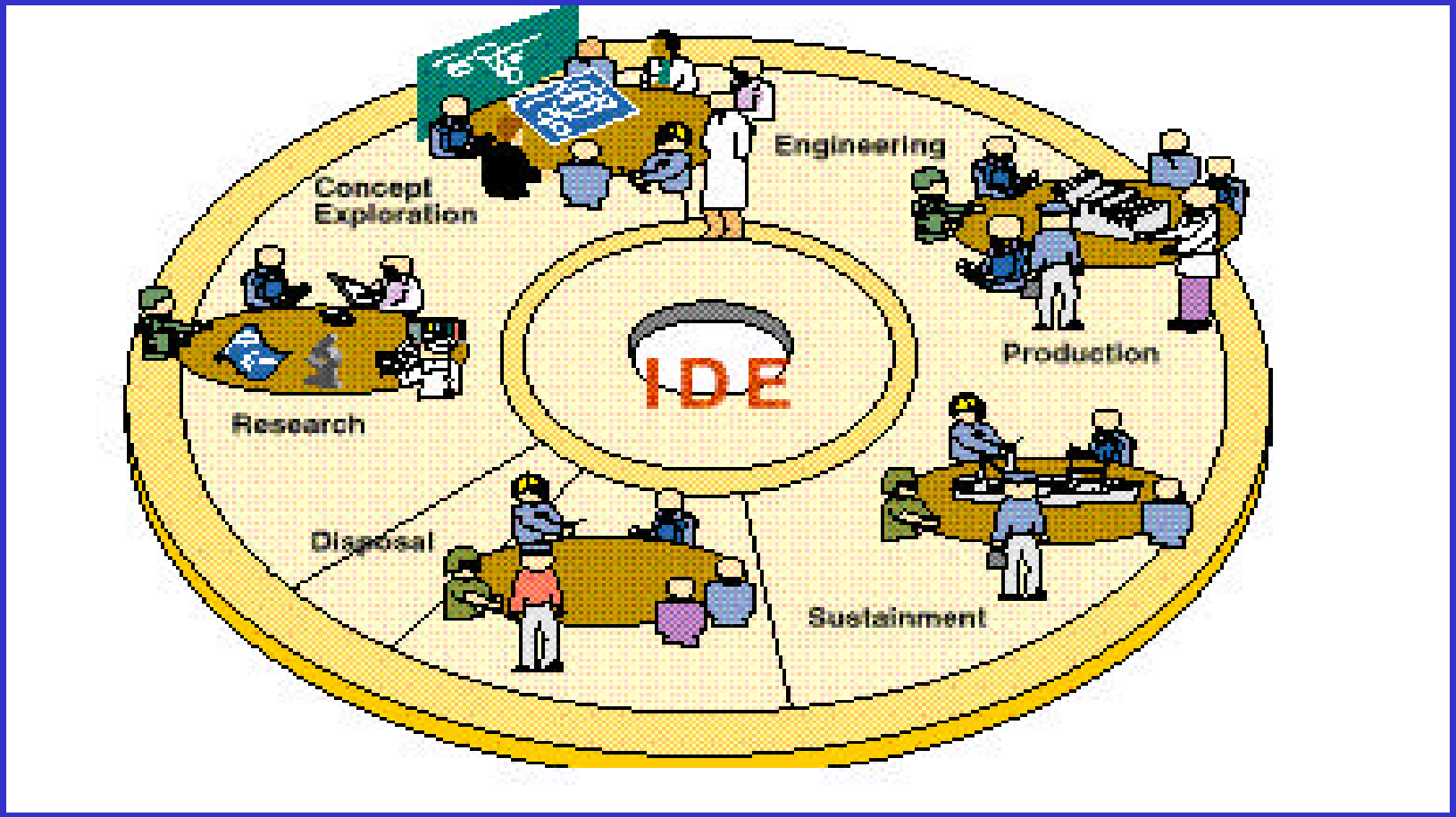
Commercial Practices

Concurrent Engineering

Total System Performance Responsibility

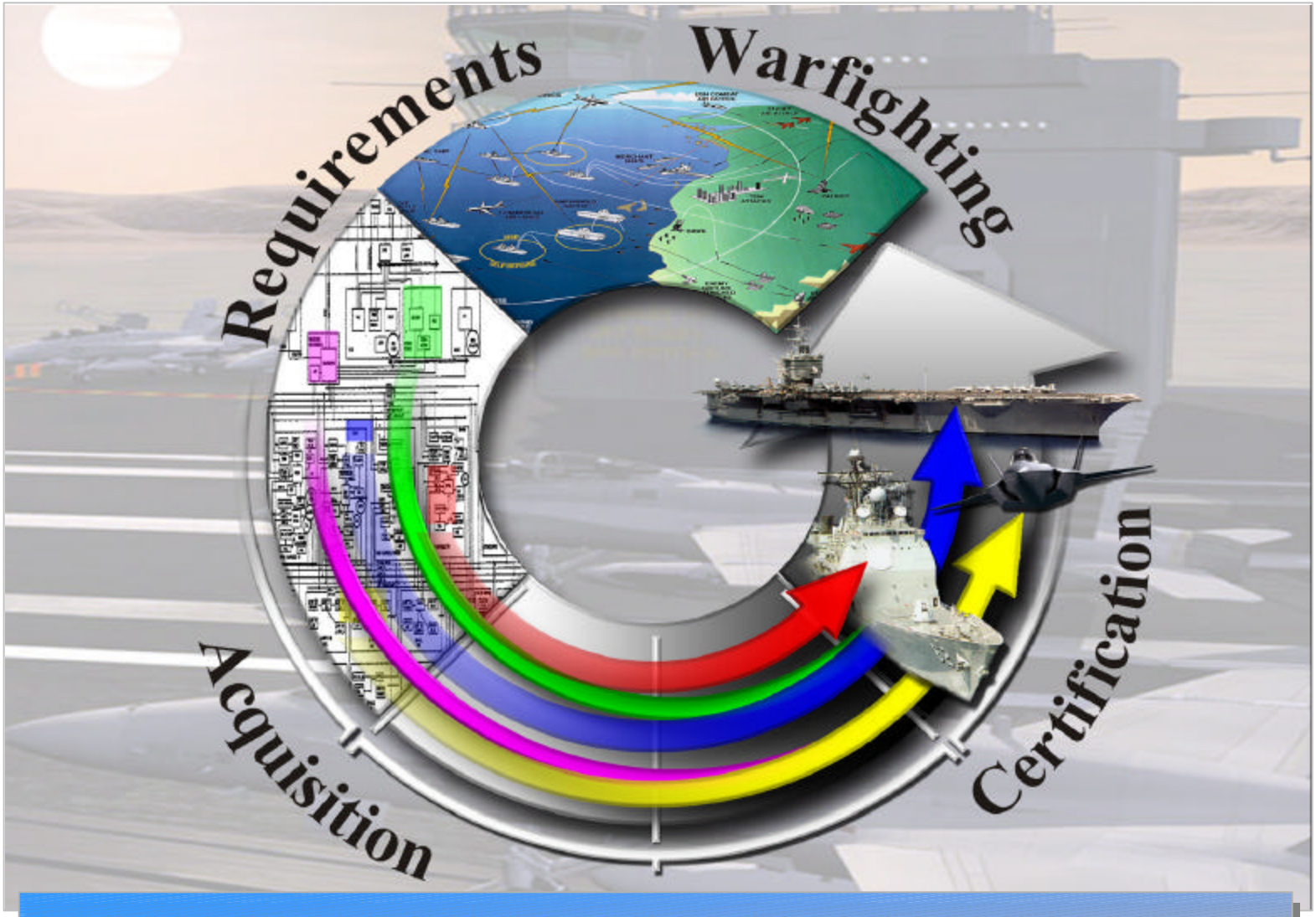
Full Service Contracting

Integrated Digital Environment (IDE)



Paperless Acquisition is a couple of pieces of the pie. IDE is the whole pizza!!

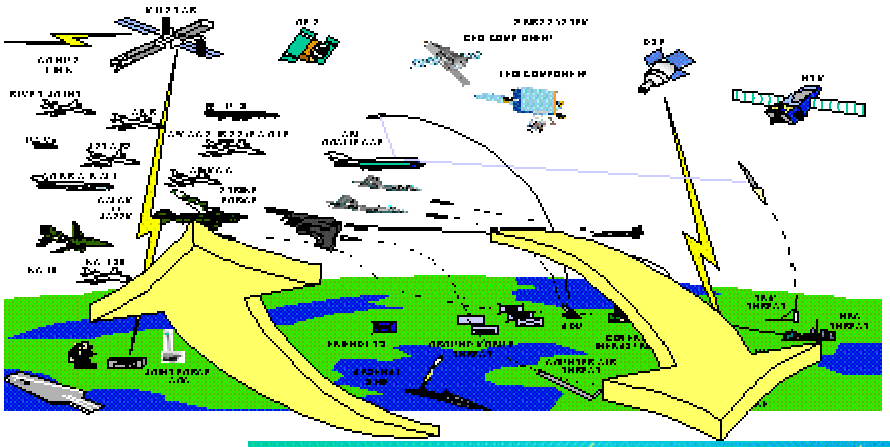
Navy Chief Engineer
System of Systems Engineering



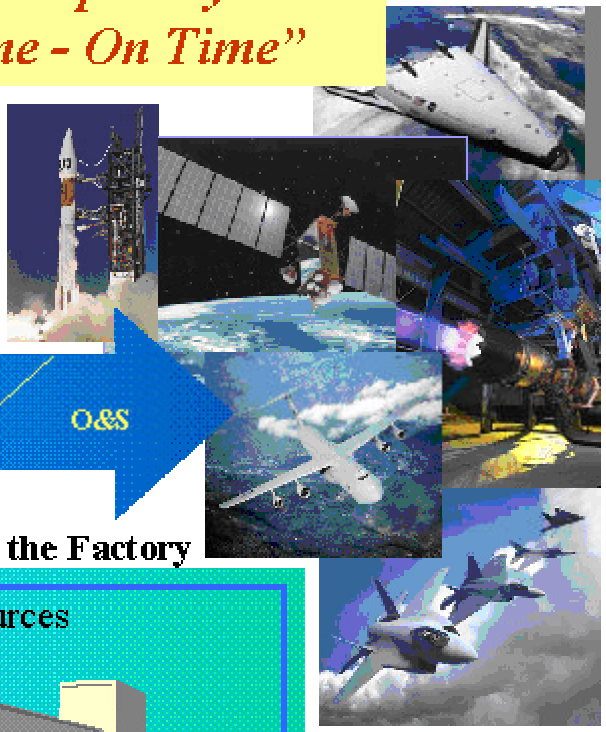
Modeling and Simulation is
Fundamental to the Process!

RADM Paige presentation at DMSO Industry Days, May 00

Air Force ManTech Vision



Affordable Weapon Systems
"First Time - On Time"



Concept Exploration & Definition | Demonstration & Validation | E&MD | Production | O&S

"Make It" in the Computer

"Make It" in the Factory

Iterate Balanced Design to Maturity

Requirements

Integrated Simulation Environment

Information

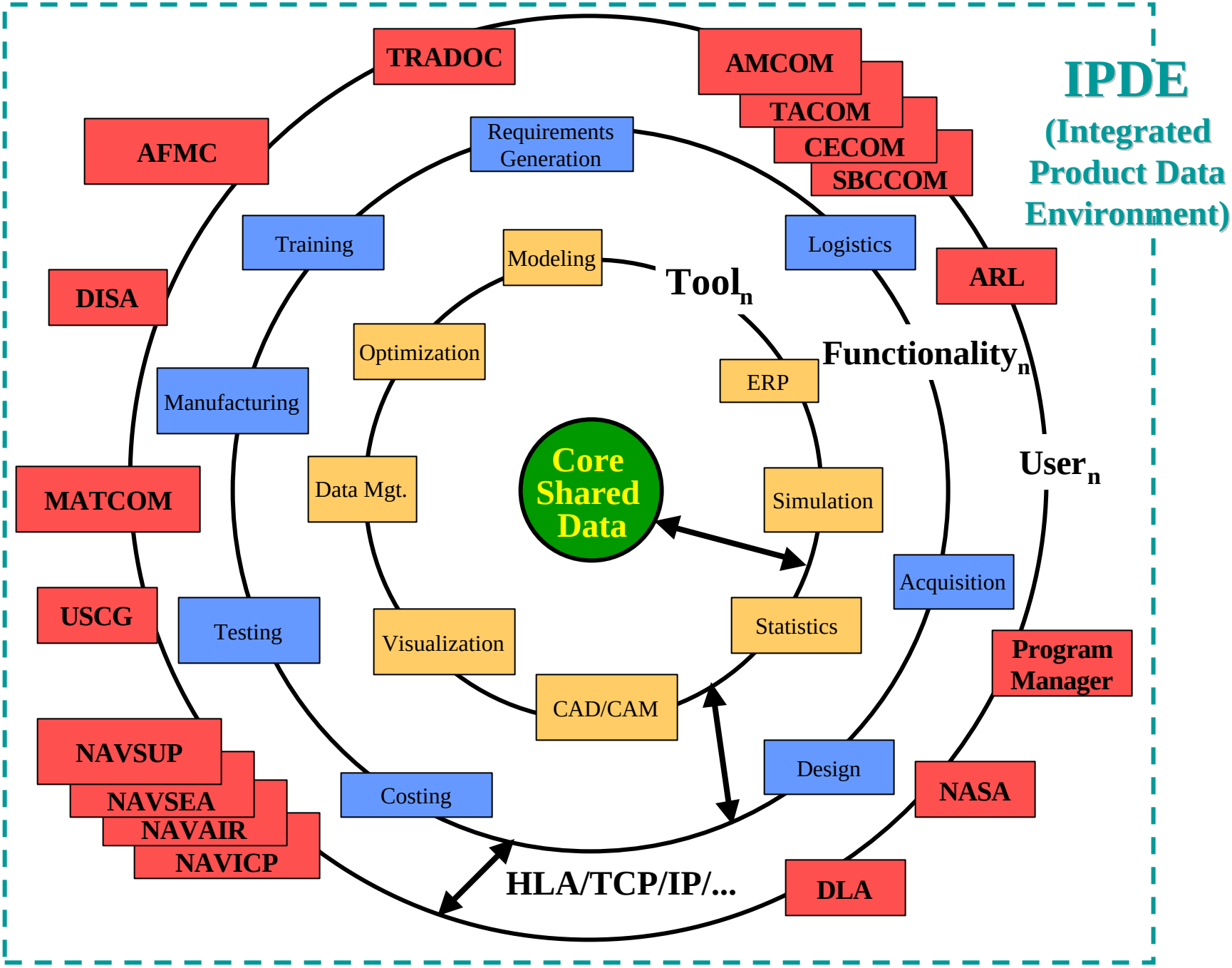
Process Data Used to Build/Update Simulations

Modify & Control Factory Processes

Resources

Manufacturing

Products


IPDE
(Integrated Product Data Environment)
TRADOC
AMCOM
TACOM
CECOM
SBCCOM
AFMC
Requirements Generation
Training
Logistics
ARL
DISA
Modeling
Tool n
Optimization
Functionality n
ERP
Manufacturing
Core Shared Data
User n
MATCOM
Data Mgt.
Simulation
Acquisition
USCG
Testing
Visualization
Statistics
Program Manager
CAD/CAM
NAVSUP
NAVSEA
NAVAIR
NAVICP
Design
NASA
Costing
HLA/TCP/IP/...
DLA

Intelligent Synthesis Environment

Intelligent

Smart tools
Smart models
Smart interfaces

→ Rapid, accurate tools and Plug & play integration for end-to-end life cycle analysis and design

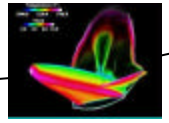
Synthesis

Advanced operations 

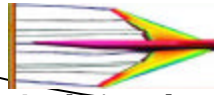
Engineering & Science 

Innovation 

Cost and Risk

Simulation data 

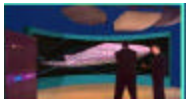
Facilities data 



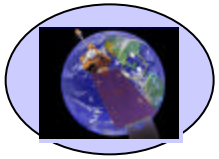
Analysis and Design Tools

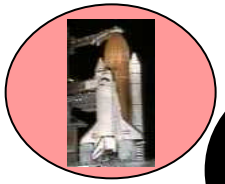
Environment

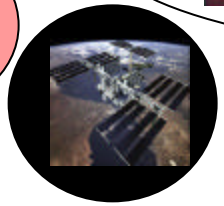
Distributed Collaboration
Virtual presence



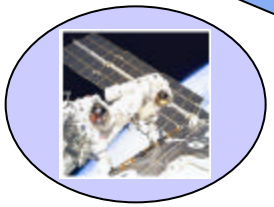
3-D Immersion
Heterogeneous hardware and software



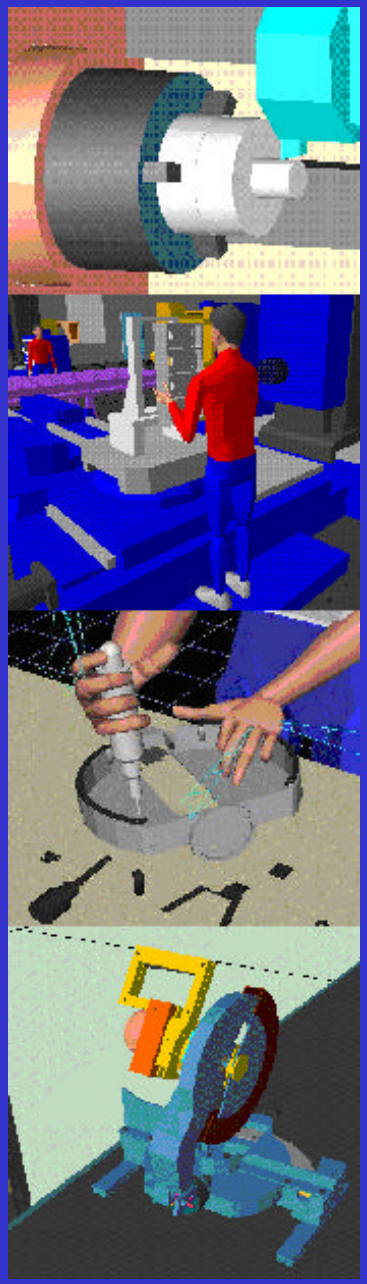




Mission-Related Large-Scale Applications

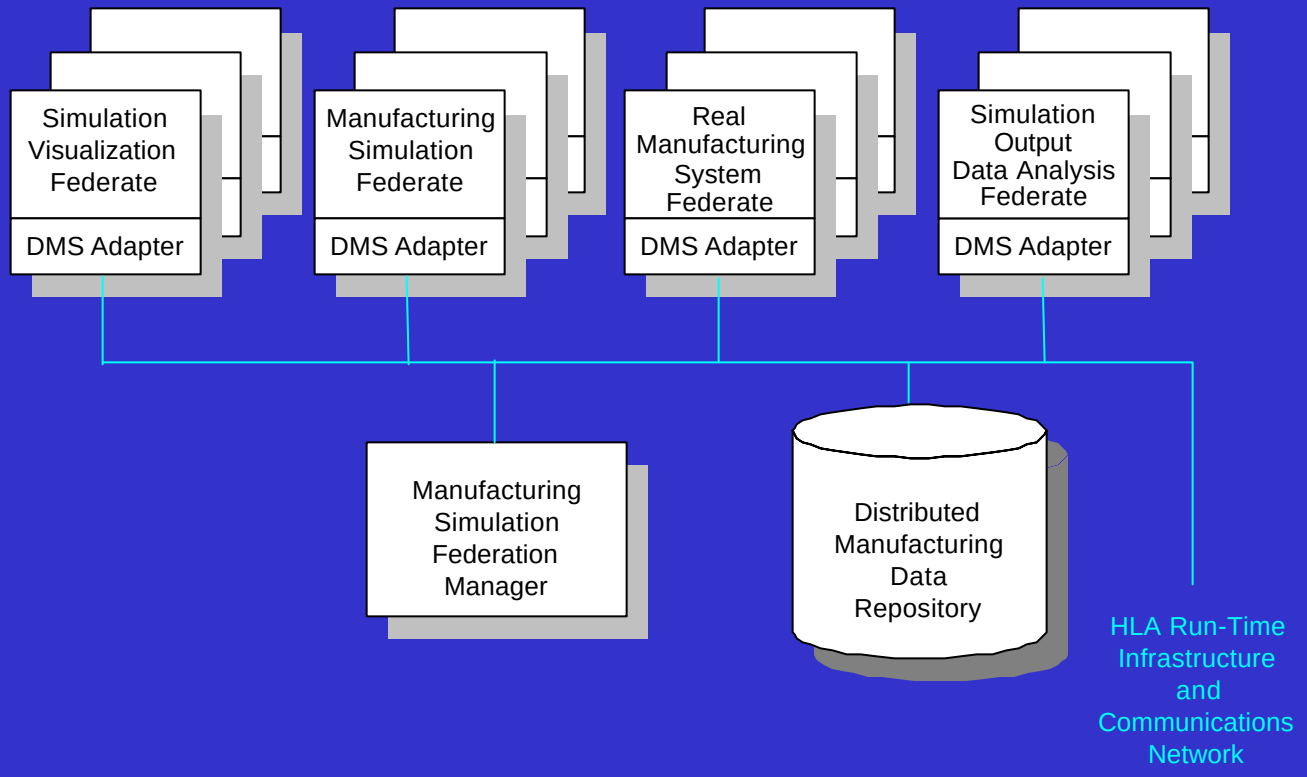


Infuse mature technology from R&D labs into practice



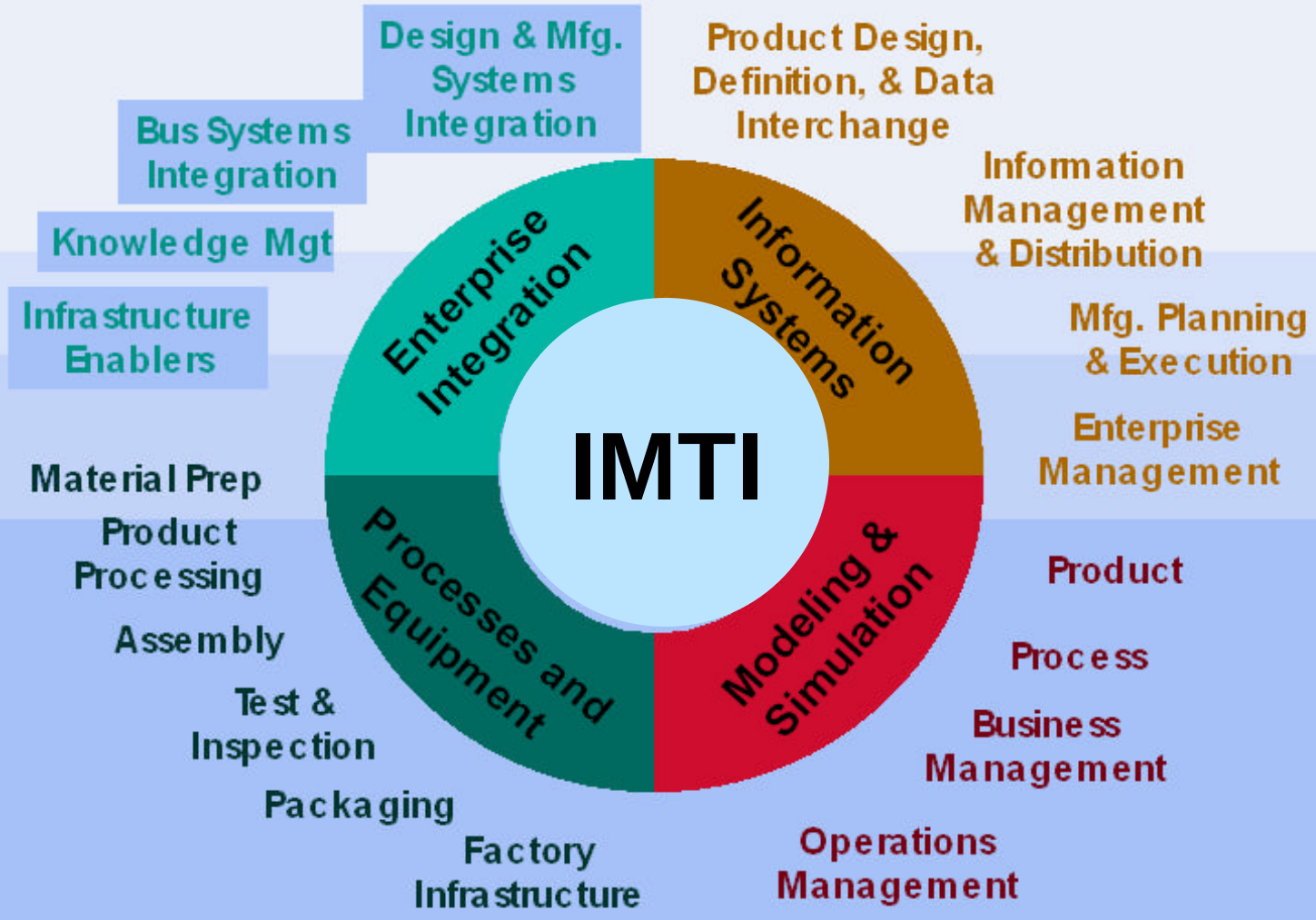
NIST Manufacturing Simulation and Visualization Program

Develop data interfaces and test methods for integrating manufacturing simulation and visualization applications to improve the accessibility and interoperability of this technology for U.S. industry.



Integrated Manufacturing Technology Initiative

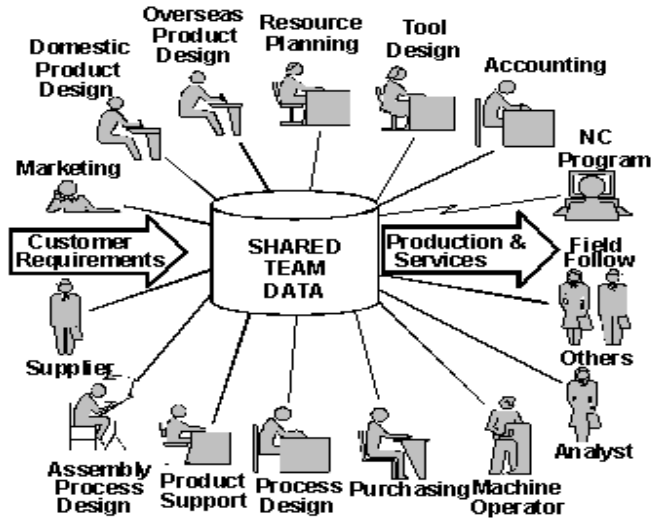
"M&S will be the way products and processes are designed and integrated"

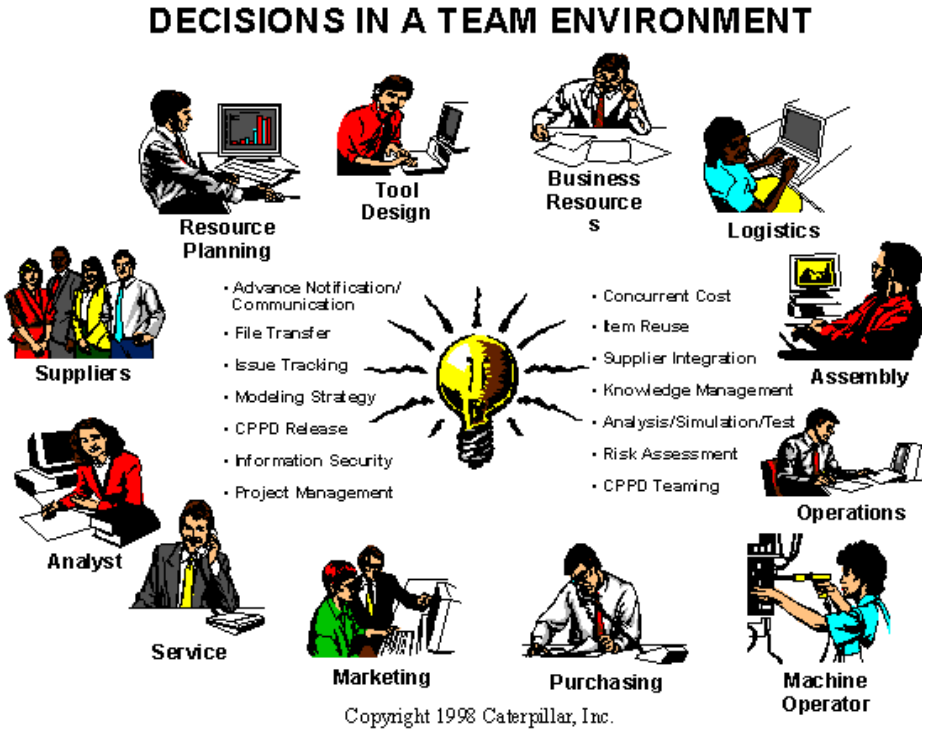


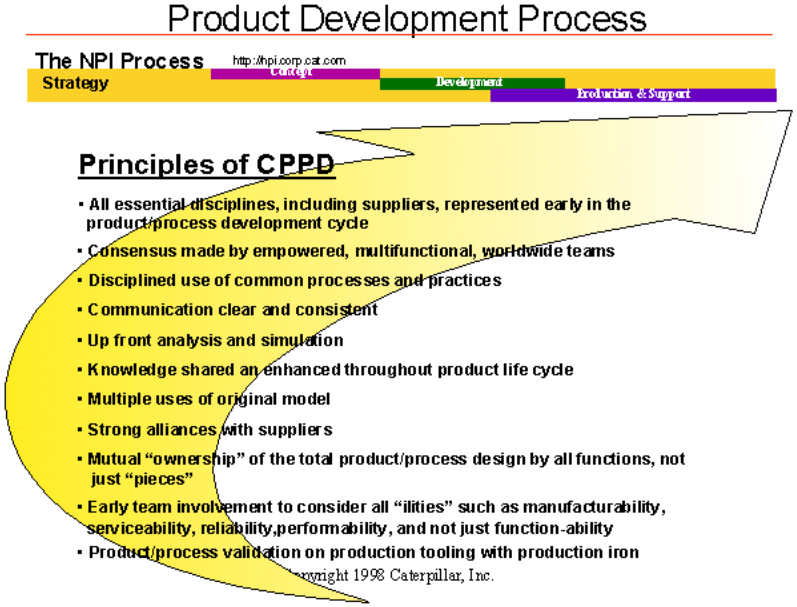
Caterpillar's "Concurrent Product and Process Development"

Vision

"Empowered, multifunctional, worldwide teams, working in a high velocity, concurrent environment utilizing shared knowledge to provide products and services which exceed customer expectations, while improving enterprise profitability."







Caterpillar presentation at Implementation Road Map 1998, D. H. Brown Associates Inc.

Technology & Tools

DAIMLERCHRYSLER

Fast Car

Links CAx Tools with Business Systems for Real-Time Collaboration

CORE BUSINESS PROCESSES

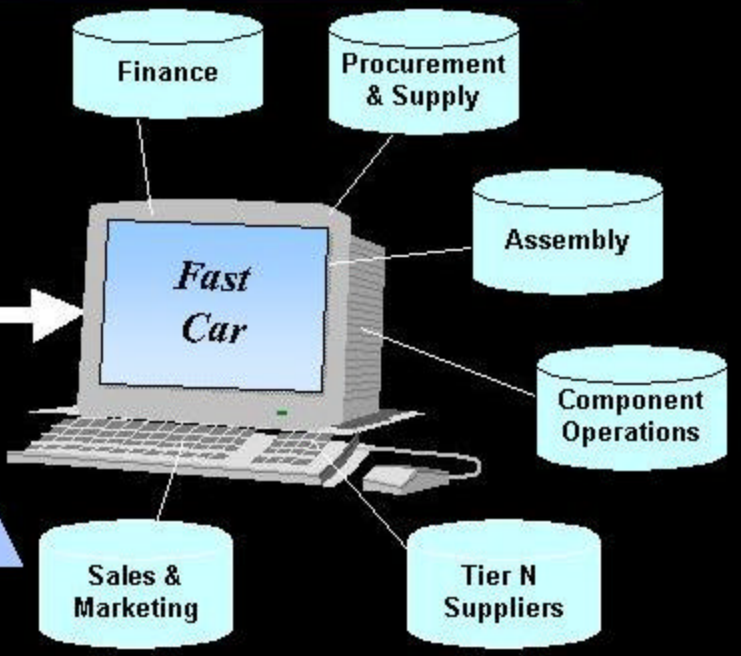
Product Creation

Volume Production

Customer Acceptance

Technology Management

Concept Development | **Design** | **Execution** | **Launch**

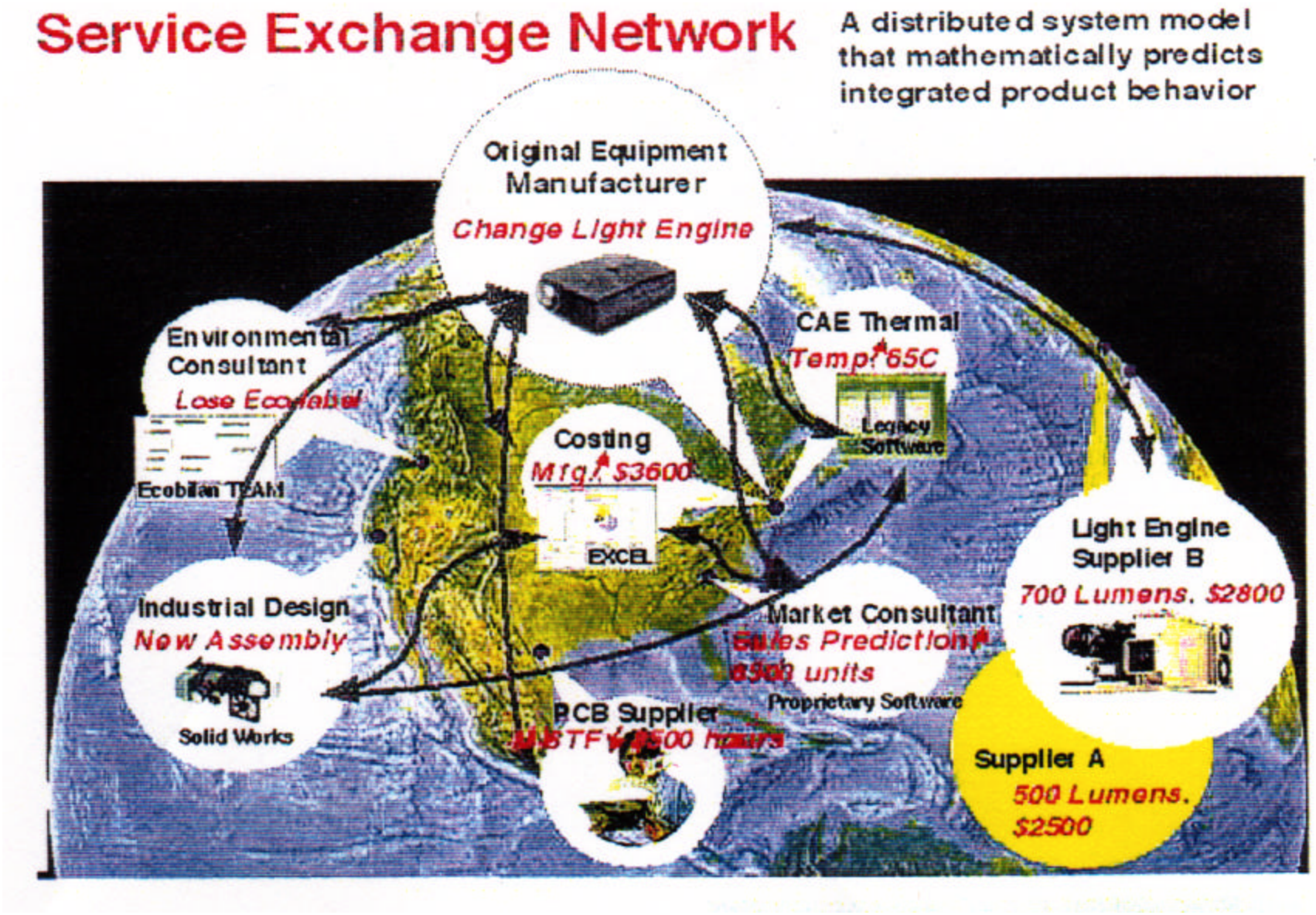


A Seamless Product Creation Communication Environment

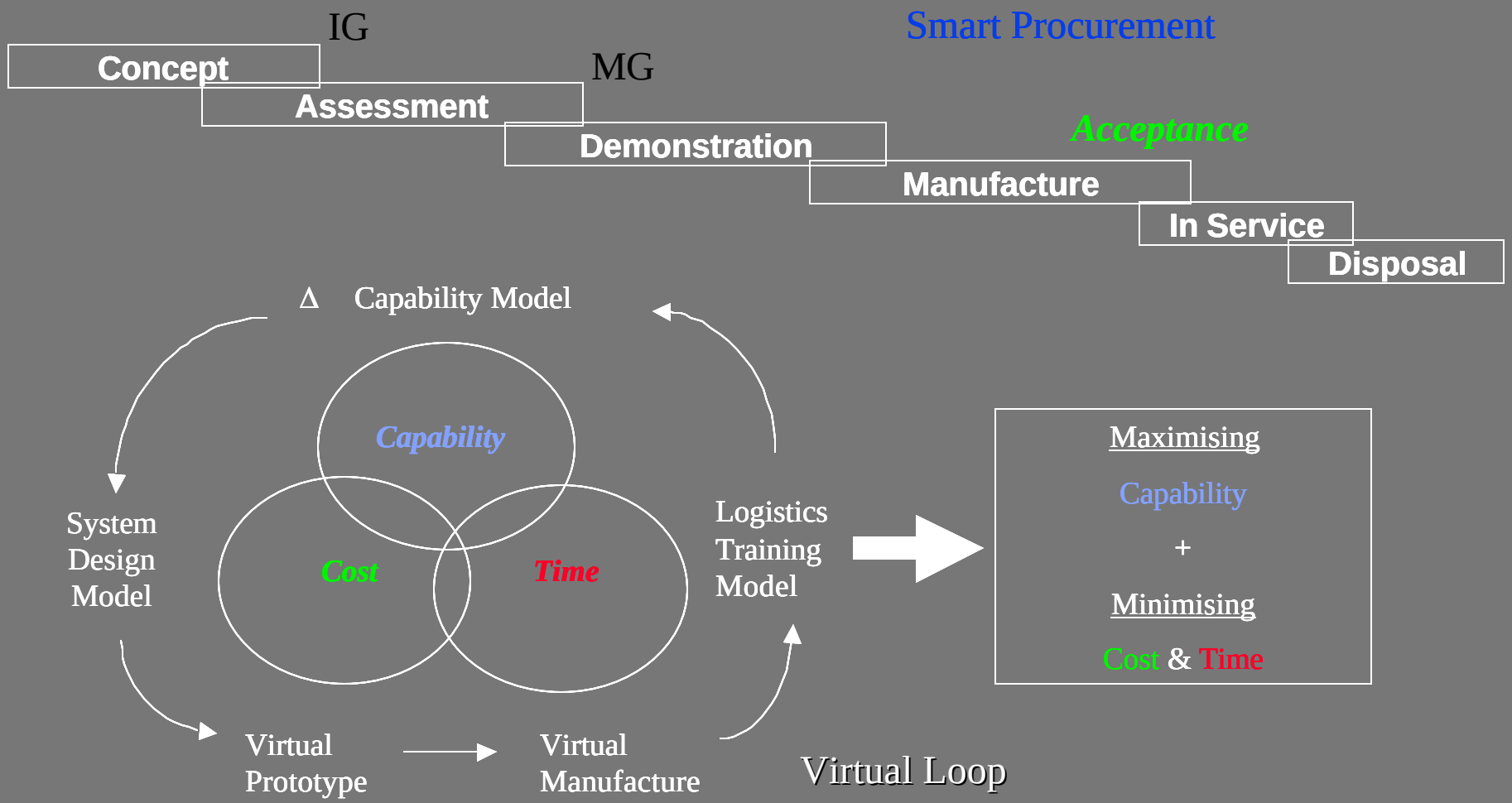
Roger Lundberg, Daimler-Chrysler, Implementation Road Map 2000, D. H. Brown Associates Inc.

MIT's Center for Innovation in Product Development

Distributed Object Modeling Environment (DOME)



Synthetic Environment Based Acquisition



DERA

A Few Others

- **Joint Computer-Aided Acquisition and Logistics Support**
- **Interoperability Clearing House**
- **Knowledge Management Initiatives**
- **DARPA's Agile Manufacturing**
- **MultiView (DUSD(L)/TARDEC)**
- **National Research Council & Institute for Defense Analyses studies**
  - "Advanced Engineering Environments", "Modeling and Simulation Enhancements for 21st Century Manufacturing and Acquisition", "Complex Product Realization 2020"
- **E-commerce marketplace ventures** (e.g., COVISINT, EXOSTAR)

Lifting the Hood

Initiatives & approaches

Shared concepts

- Despite differing names, acronyms, application areas and organizations, examination shows a high degree of commonality in the underlying concepts of these activities
- These shared concepts represent a consensus view of how the acquisition process should change

Advanced Acquisition Concepts

- Enterprise-wide electronic interactions and information sharing (info created once, used broadly)
- Early and continuing collaborative exploration of the largest possible trade space across the life cycle, including time-phased requirements and technology insertion
- Conceiving, designing, testing and managing to optimize "system of systems" attributes, including interoperability
- M&S-based assessments early in the development cycle; alternative system designs built, tested and operated in the computer before critical decisions are locked-in and manufacturing begins
- Reduction of activities more cost-effectively performed in M&S, such as drawings, mock-ups, prototypes and some aspects of live testing
- Flexible, iterative mixing of simulations and hardware
- Maximum appropriate reuse of all resources - information, software (including COTS), expertise, facilities, etc. – across phases, programs and organizations

Necessary Building Blocks

- **Deciding which concepts to implement, and how, is a difficult task for a program manager (PM)**
  - Acquisition environment must be appropriate for task and team
  - Must consider cost, schedule, and risk

- **Implementing these advanced acquisition concepts requires certain <u>enablers</u> (building blocks)**

- **PMs are unlikely to have the expertise, money and time to develop them from scratch**
  - Making enablers available to PMs is essential for them to compose their acquisition environments in a cost-effective way

Ten Enabler Categories

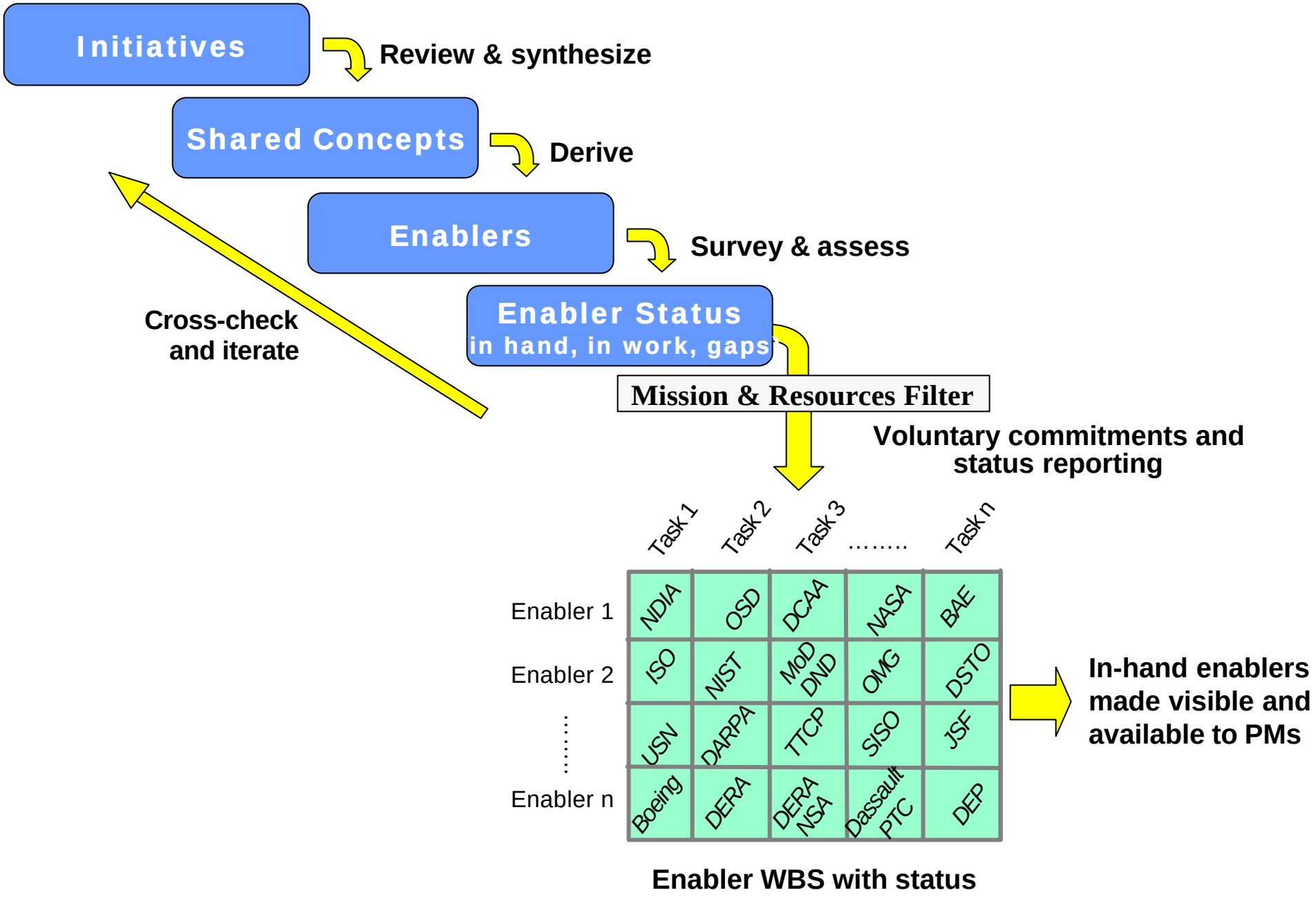
- **Policy, law and organizational changes**
- **Process changes**
- **Standards for data interchange**
- **Standards for M&S software application interoperability**
- **Authoritative information sources**
- **Capable, reusable models and simulations**
- **Means to manage collaboration & multi-domain optimization**
- **Means to identify, protect & obtain reusable resources**
- **Business case evidence**
- **Education, motivation & evolution of work force**

Note: Well-understood and broadly available enablers (e.g., computers, networks, communication protocols) are omitted

Gap Analysis

- Identifying required enablers must be accompanied by a gap analysis to determine if they are:
  - In hand
  - In work
  - Not yet addressed
- To do this assessment we must consider all activities, such as those I surveyed, that may produce enablers
- When the gaps are identified, the various interested organizations can voluntarily decide whether to take action
- Result: a collaborative situation report and plan of action

Process Overview



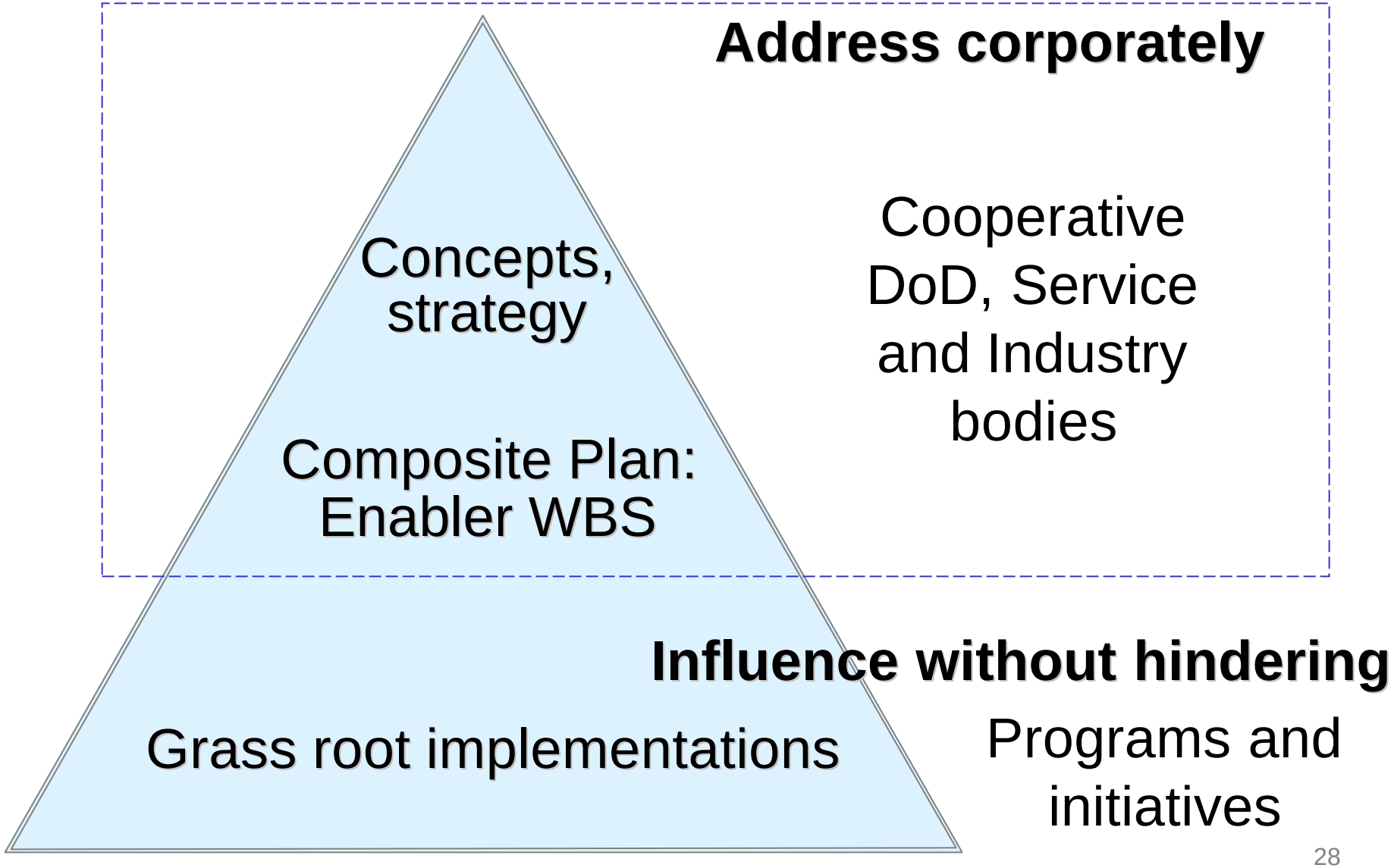
Benefits

- **A comprehensive list of the enablers necessary to fully implement the concepts provides**:
  - Understanding of requirements inherent in implementing the concepts - a work breakdown structure (WBS)
  - Means to cut though the fog of demos and assertions
- **Gap analysis assesses progress, provides**:
  - Insights on implementation feasibility, cost and risk
  - Visibility to encourage broader reuse of viable enablers
  - Situational awareness for allocating resources
- **Voluntary commitments and status reporting yields a collaborative, cost-effective plan of work**
  - Means to establish synergy among the various players

Some Guiding Principles

- Stay customer focused
- Open process, with all information publicly available
- Foster community ownership and cooperation
- Clear logic & traceability for each enabler requirement
- Change recommendations resolved in a way to foster confidence
- Provisions for objective assessments of the maturity and usefulness of individual enablers
- Highlight products and activities producing enablers
- Don’t challenge any current activity

Management Strategy: Enable, Not Direct

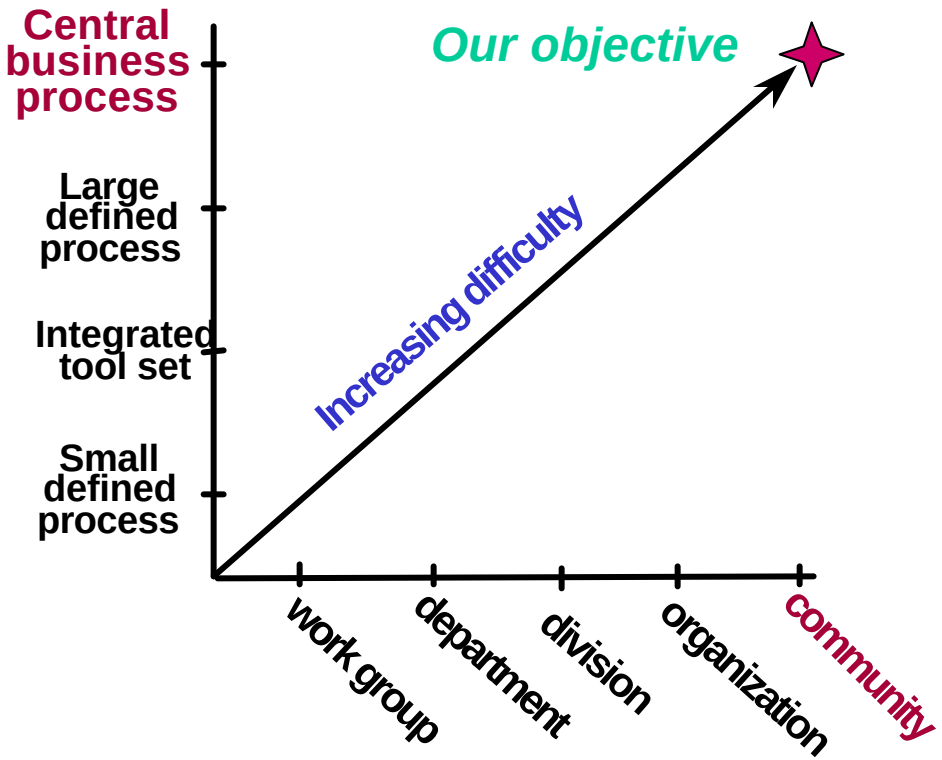


Support Thus Far

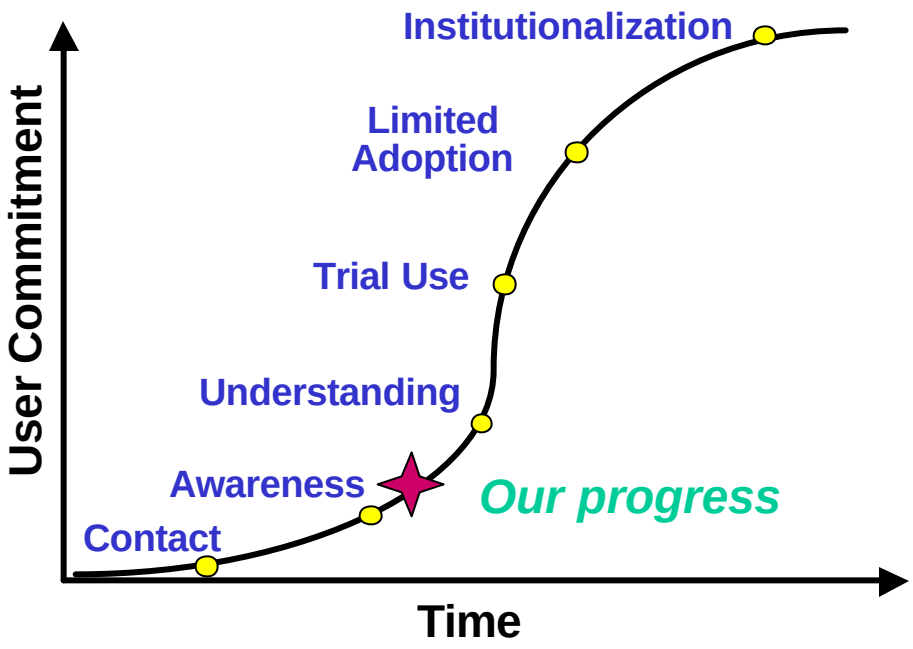
- **DoD Acquisition Council**
  - Part of Executive Council on Modeling and Simulation (EXCIMS)
- **The Technical Cooperation Program (TTCP) *Systems Engineering for Defense Modernization* panel (JSA TP4)**
  - Australia, Canada, New Zealand, United Kingdom, United States
  - Foundation for Joint Advanced Acquisition Concepts Study (JAACS)
- **NDIA SBA Industry Steering Group**
- **NIST has pitched in, others have expressed willingness**
- **Who's next?**

Patience and Persistence!

Difficulty of Technology Transitions



How Organizations Commit to Change



Source: Daryl R. Conner and Robert W. Patterson. "Building Commitment to Organizational Change,"

Training and Development Journal (April 1983), p 18-30.


Questions?